

## **Comparison of Pesticide and Nitrate Data from Shallow Piezometers and Domestic Wells near Irrigated Fields in the Central Columbia Plateau, Washington**

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To study the quality of shallow ground water near irrigated fields (primarily irrigation circles) in the Central Columbia Plateau in eastern Washington, we sampled 30 shallow (median depth 125 ft) domestic wells and installed and sampled 18 very shallow (median depth 40 ft) piezometers during the growing seasons (March through October) of 1993 and 1994. Pesticides were detected more frequently and in larger numbers per well in piezometers. Nitrate concentrations were also larger in piezometers than in domestic wells.

One or more pesticides were detected in 83 percent of piezometers compared with 70 percent of domestic wells. Atrazine or its degradation product desethyl-atrazine was found in 67 percent of piezometers and 40 percent of domestic wells. The median atrazine concentration for both sets of wells was 0.02 microgram per liter (ug/L) and was well below the drinking water criterion of 3.0 ug/L. An average of 2.5 pesticide compounds was found in piezometers that had detections compared with 1.7 in domestic wells. Median nitrate concentrations in piezometers and domestic wells were 7.8 and 6.5 milligrams per liter as nitrogen, respectively.

Data from piezometers gave a better indication of the effects of irrigated agriculture on the quality of shallow ground water than those from domestic wells because piezometers were designed to sample water at depths as near to the water table as practical, whereas domestic wells are typically drilled as deep as necessary to obtain an adequate water supply. Additionally, piezometers were located as close to irrigation circles as possible without interfering with farming operations, whereas domestic wells area located for the convenience of the water user. The frequency of detection of pesticides and the concentrations of nitrate were lower in the domestic wells than in the piezometers because contaminants were adsorbed, degraded, or transported away laterally before reaching the intakes of the domestic wells. Similarly, some of the ground water from domestic wells may have flowed in laterally from an area of different land use or from leaky canals. The blurring of the seasonal pesticide signature in the domestic wells appears to result from mixing of water that recharged during different times of the growing season.

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